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# PATENT ABSTRACTS OF JAPAN

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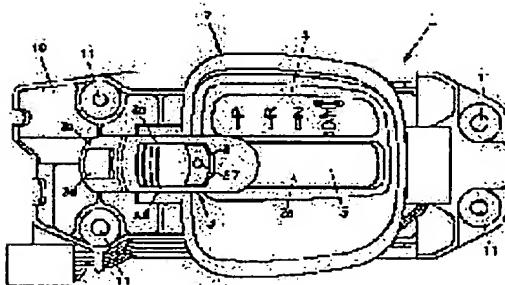
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## (54) SHIFT OPERATION INPUT APPARATUS OF AUTOMATIC TRANSMISSION

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To change over between a manual shift mode and an automatic shift mode within a single range and make it distinguishable that a vehicle is provided with a manual shift mode by the outer appearance of a shift lever.



**SOLUTION:** This transmission comprises a second shift pin for switching modes besides a first shift pin for regulating a normal range operation and the first pin and a second pin are so constituted as to be pushed down and pushed up by a regulation releasing button 3d and a mode switching switch 3e, respectively. It can be judged based on the outer appearance of the lever 3 that a vehicle is provided with a manual shift mode by installing the mode changeover switch 3e in an operational part 3c in the upper end of the shift lever 3.

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## CLAIMS

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[Claim(s)]

[Claim 1] The gear change actuation input unit of the automatic transmission with which it has the 1st gear change mode which is characterized by to provide the following, and which changes gears automatically based on the gear change property beforehand set up according to operational status, and the 2nd gear change mode which changes gears according to an operator's manual operation, and both the these 1st and 2nd gear change mode was constituted possible [ achievement ] in the predetermined splash location of two or more splash locations of a shift lever The 1st pin member prepared in the shift lever movable in the shaft orientations of this lever The 2nd pin member prepared movable between the 1st location and the 2nd location in shaft orientations which are the shaft orientations of this lever and are different from the migration direction of the above-mentioned 1st pin member in a shift lever while having the 1st guide gate which collaborates with this 1st pin member and regulates actuation between the splash locations of the plurality of a shift lever When it engages with this 2nd pin member and a shift lever is in splash locations other than the above-mentioned predetermined splash location, while forbidding the migration in the 2nd location of this 2nd pin member from the 1st location of the above When a shift lever is in the above-mentioned predetermined splash location, it has the above 1st of this 2nd pin member, and the 2nd guide gate which permits the 2nd migration between locations. And while the operating member operated by the operator is prepared so that the above-mentioned 2nd pin member may be moved to a shift lever between the 1st location of the above, and the 2nd location A mode selection means to choose the 1st gear change mode when the 2nd pin

member is moved to the 1st location by actuation of the above-mentioned operating member by the operator, and to choose the 2nd gear change mode when moved to the 2nd location when a shift lever is in the above-mentioned predetermined splash location

[Claim 2] The 1st guide gate and the 2nd guide gate are the gear change actuation input unit of the automatic transmission according to claim 1 characterized by being prepared in the single guide plate with which car-body flank material was equipped.

[Claim 3] The 1 side of this lever is equipped with a guide plate along the actuation direction between the splash locations of the plurality of a shift lever. The 2nd guide gate It is formed as a slot which penetrates this guide plate. The 2nd pin member While projecting through this slot in the field by the side of the anti-shift lever of a guide plate, a mode selection means It has the switch member for mode selection in which ON actuation is carried out by press. This switch member It is prepared in the field by the side of the anti-shift lever of the above-mentioned guide plate with the object for shift ups and the switch member for down shifts in which ON actuation is similarly carried out by press. When a shift lever is in a predetermined splash location, and the above-mentioned 2nd pin member is moved to the 2nd location from the 1st location, the above-mentioned switch member for mode selection is pressed by this 2nd pin member. Where the 2nd pin member is moved to the 2nd location, when a shift lever is rocked in the above-mentioned predetermined splash location being alike --- the gear change actuation input unit of the automatic transmission according to claim 2 characterized by being constituted so that the above-mentioned switch member for shift ups or the switch member for down shifts may be pressed by this 2nd pin member.

[Claim 4] The switch member for mode selection, the switch member for shift ups, and the switch member for down shifts are the gear change actuation input unit of the automatic transmission according to claim 3 characterized by holding in a single case member and attaching this case member in the field by the side of the anti-shift lever of a guide plate.

[Claim 5] The gear change actuation input unit of the automatic transmission according to claim 4 characterized by preparing the contact section which contacts the end section of the 2nd pin member rocked with the splash in the predetermined splash location of a shift lever to this reinforcement member while the reinforcement member for this case member anchoring is prepared in the field by the side of the shift lever of a guide plate so that this guide plate may be pinched by the case member.

[Claim 6] The gear change actuation input unit of the automatic transmission according to claim 5 characterized by preparing the supporter material which supports the 2nd switch member for mode selection which assists the switch member for mode selection in the opposite hand of a guide plate, and preparing in it the 2nd contact section which contacts the other end of the 2nd pin member rocked with the splash in the predetermined splash location of a shift lever to this supporter material on both sides of a shift lever.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the gear change actuation input unit of the automatic transmission which has the manual mode which switches a gear ratio by carrying out splash actuation of the shift lever other than an automatic transmission and the auto mode which switches a gear ratio automatically especially based on the gear change property set up beforehand at a cross direction.

[0002]

[Description of the Prior Art] A gear ratio is determined in recent years based on the gear change properties beforehand set up as an automatic transmission for cars according to operational status, such as the vehicle speed and a throttle opening, and these actual measurements. Auto mode which switches a power transfer path automatically so that this determined gear ratio may be attained (it is also called below "D mode" or "the 1st gear change mode".) Manual mode which switches a gear ratio to others by carrying out splash actuation of the shift lever at a cross direction (it is also called below "M mode" or "the 2nd gear change mode".) What it had is being put in practical use.

[0003] Generally in this automatic transmission, a shift lever by carrying out splash actuation into the change-over path which extends in a car-body cross direction Each range of P (parking), R (retreat), N (neutrality), and D (drive) (it is also called a "splash location" below.) While it is supposed that it is selectable and D mode is set up in the above-mentioned D range (parallel connected type) [ whether M range in which M mode is set up is arranged from the above-mentioned D range to parallel at a change-over path through the horizontal path which extends in a longitudinal direction, and ] Or where it made the above-mentioned D range adjoin, it has arranged in the end section of a change-over path (tandem type) and this M range is chosen by the shift lever By carrying out splash actuation of the shift lever from a center valve position to the front within these M range, when a gear ratio carries out an one-step shift up and carries out splash actuation to back, it is constituted so that a gear ratio may carry out an one-step down shift.

[0004] However, also in any of the above-mentioned parallel connected type or a tandem type, since additional arrangement of the M range in which M mode is set up is carried out newly in addition to the conventional range configuration, the number of range increases, the whole change-over path configuration thru/or the active region of a shift lever become large, and in connection with this, on the whole, the dimension of a gear change actuation input unit will be expanded, and will cause trouble to the installation to a car body, and the layout between peripheral devices.

[0005] As a thing coping with such a problem, to JP,6-74318,A In order to use as the common range of 1 the range in which D mode is set up, and the range in which M mode is set up Form a mode change-over switch in the grip section of a shift-lever upper bed, and a seesaw-type gear change switch is formed in the pars intermedia of a shift lever, respectively. The mode is switched by turns between D mode and M mode by carrying out push actuation of the

above-mentioned change-over switch, where D range is chosen by the shift lever. The shift up or the technique by which a down shift is carried out is indicated for the gear ratio by carrying out push actuation of either of the both ends of the above-mentioned gear change switch in M mode. According to this, since both D mode and M mode are set up in a single common range, it becomes unnecessary to newly carry out additional arrangement of the M range, buildup of the number of range will be prevented, and layout nature will improve.

[0006]

[Problem(s) to be Solved by the Invention] However, since the change between D mode and M mode is performed only by carrying out push actuation of the mode change-over switch formed in the shift lever, as important actuation, the feeling of actuation is weak in the Prior art indicated by the above-mentioned official report, on car transit called the change in gear change mode.

[0007] On the other hand, although it is possible to constitute so that the change between D mode and M mode may be performed by carrying out splash actuation of the shift lever as well as selection actuation of a range within the above-mentioned D range in order, control of this mode change becomes complicated in that case, and it is hard to attach the distinction of being a car with M mode only from the appearance of a shift lever, and inferior to the cognition nature of being a car with M mode.

[0008] Then, this invention copes with the above-mentioned nonconformity at the time of constituting so that D and the M car mode may be attained in a single predetermined range, and makes it a technical problem to offer the gear change actuation input unit of the automatic transmission which can aim at improvement in the cognition nature of being a car with M mode, and an improvement of control of the mode change in the above-mentioned predetermined range.

[0009]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the following means are used in this invention.

[0010] First, invention (henceforth "the 1st invention") indicated to claim 1 of the claim of this application The 1st gear change mode which changes gears automatically based on the gear change property beforehand set up according to operational status, It has the 2nd gear change mode which changes gears according to an operator's manual operation. It is the gear change actuation input unit of the automatic transmission with which both the these 1st and 2nd gear change mode was constituted possible [ achievement ] in the predetermined splash location of two or more splash locations of a shift lever. While having the 1st guide gate which collaborates with the 1st pin member prepared in the shift lever movable in the shaft orientations of this lever, and this 1st pin member, and regulates actuation between the splash locations of the plurality of a shift lever The 2nd pin member prepared movable between the 1st location and the 2nd location in shaft orientations which are the shaft orientations of this lever and are different from the migration direction of the above-mentioned 1st pin member in a shift lever, When it engages with this 2nd pin member and a shift lever is in splash locations other than the above-mentioned predetermined splash location, while forbidding the migration in the 2nd location of this 2nd pin member from the 1st location of the above When a shift lever is in the above-mentioned predetermined splash location, it has the above 1st of this 2nd pin member, and the 2nd guide gate which permits the 2nd migration between locations. And while the operating member operated by the operator is prepared so that the above-mentioned 2nd pin member may be moved to a shift lever between the 1st location of

the above, and the 2nd location When a shift lever is in the above-mentioned predetermined splash location, and the 2nd pin member is moved to the 1st location by actuation of the above-mentioned operating member by the operator, the 1st gear change mode is chosen. When moved to the 2nd location, it is characterized by having a mode selection means to choose the 2nd gear change mode.

[0011] Moreover, invention (henceforth "the 2nd invention") indicated to claim 2 is characterized by establishing the 1st guide gate and the 2nd guide gate in the single guide plate with which car-body flank material was equipped in the 1st invention of the above.

[0012] Furthermore, invention (henceforth "the 3rd invention") indicated to claim 3 It sets to the 2nd invention of the above, and the 1 side of this lever is equipped with a guide plate along the actuation direction between the splash locations of the plurality of a shift lever. The 2nd guide gate It is formed as a slot which penetrates this guide plate. The 2nd pin member While projecting through this slot in the field by the side of the anti-shift lever of a guide plate, a mode selection means It has the switch member for mode selection in which ON actuation is carried out by press. This switch member It is prepared in the field by the side of the anti-shift lever of the above-mentioned guide plate with the object for shift ups and the switch member for down shifts in which ON actuation is similarly carried out by press. When a shift lever is in a predetermined splash location, and the above-mentioned 2nd pin member is moved to the 2nd location from the 1st location, the above-mentioned switch member for mode selection is pressed by this 2nd pin member. Where the 2nd pin member is moved to the 2nd location, when a shift lever is rocked in the above-mentioned predetermined splash location, it is characterized by being constituted so that the above-mentioned switch member for shift ups or the switch member for down shifts may be pressed by this 2nd pin member.

[0013] And in the 3rd invention of the above, the switch member for mode selection, the switch member for shift ups, and the switch member for down shifts are held in a single case member, and invention (henceforth "the 4th invention") indicated to claim 4 is characterized by attaching this case member in the field by the side of the anti-shift lever of a guide plate.

[0014] On the other hand, invention (henceforth "the 5th invention") indicated to claim 5 While the reinforcement member for this case member anchoring is prepared in the field by the side of the shift lever of a guide plate in the 4th invention of the above so that this guide plate may be pinched by the case member It is characterized by preparing the contact section which contacts the end section of the 2nd pin member rocked with the splash in the predetermined splash location of a shift lever to this reinforcement member.

[0015] And invention (henceforth "the 6th invention") indicated to claim 6 A shift lever is pinched in the 5th invention of the above. To the opposite hand of a guide plate The supporter material which supports the 2nd switch member for mode selection which assists the switch member for mode selection is prepared. It is characterized by preparing the 2nd contact section which contacts the other end of the 2nd pin member rocked with the splash in the predetermined splash location of a shift lever to this supporter material.

[0016] By using the above-mentioned means, this application each invention acts as follows, respectively.

[0017] First, while according to the 1st invention being constituted so that D and the M car mode may be attained in a predetermined range of two or more range, to a shift lever, it is movable in the shaft orientations of this lever, and the 1st pin member which collaborates with the 1st guide gate and regulates the actuation between range of this lever is prepared.

[0018] The 2nd pin member is prepared apart from [ it is the same and / a shift lever ] the

above-mentioned 1st pin member. Moreover, this 2nd pin member In different shaft orientations from the migration direction of the above-mentioned 1st pin member while [ between the 1st location and the 2nd location ] it is movable When this 2nd pin member engages with the 2nd guide gate and a shift lever is in range other than the above-mentioned predetermined range, while the migration in the 2nd location from the 1st location of the above is forbidden, when a shift lever is in the above-mentioned predetermined range, the that 1st and 2nd migration between locations is permitted.

[0019] And an operating member is prepared in a shift lever and 1st [ of the above-mentioned 2nd pin member ] and 2nd migration between locations is performed to it by actuation of this operating member by the operator. therefore, when a shift lever is in the above-mentioned predetermined range When an operator can operate the above-mentioned operating member, and can move the 2nd pin member between the 1st location and the 2nd location, consequently the 2nd pin member is moved to the 1st location When D mode is chosen and it is moved to the 2nd location by the mode selection means, M mode will be chosen, and in the above-mentioned predetermined range, D and the M car mode will be attained by this.

[0020] In that case, since the operating member operated by the operator is prepared in the shift lever, it is easily recognized from the appearance of this shift lever that it is a car with M mode.

[0021] Moreover, since the change in the mode is performed by whether the 2nd pin member is in the 1st location, or it is in the 2nd location, control of the mode change will not become complicated.

[0022] On the other hand, since the 1st guide gate for the 1st pin members and the 2nd guide gate for the 2nd pin members are especially established in the single guide plate with which car-body flank material was equipped according to the 2nd invention, the member which prepares each guide gate can be communalized and buildup of components mark is controlled.

[0023] Moreover, while the configuration of the guide-plate circumference is materialized more, and the 1 side of this lever is equipped with this guide plate along the range actuation direction of a shift lever according to the 3rd invention according to it, the 2nd guide gate is formed as a slot which penetrates this guide plate, and the 2nd pin member projects through the slot which is this 2nd guide gate in the field by the side of the anti-shift lever of a guide plate.

[0024] On the other hand, a mode selection means has the switch member turned on by being pressed, and is formed in the field by the side of the anti-shift lever in which the 2nd pin member projects [ this switch member for mode selection, and the switch member for shift ups and the switch member for down shifts which are turned on by similarly being pressed ] in the above-mentioned guide plate.

[0025] And since the above-mentioned switch member for mode selection is pressed by this 2nd pin member when a shift lever is in a predetermined range and the 2nd pin member is moved to the 2nd location from the 1st location, by this, this switch member for mode selection will turn on, and M mode will be chosen. On the contrary, when the 2nd pin member is moved to the 1st location from the 2nd location, since press according [ the above-mentioned switch member for mode selection ] to this 2nd pin member is canceled, by this, this switch member for mode selection will turn off, and D mode will be chosen.

[0026] Moreover, it is in the condition that the 2nd pin member was moved to the 2nd location, that is, since the above-mentioned switch member for shift ups or the switch member for down shifts is pressed by this 2nd pin member when a shift lever is rocked within the

above-mentioned predetermined range where M mode is chosen, by this, these switch members will be turned on and manual gear change in M mode will be performed.

[0027] Furthermore, according to the 4th invention, since it holds in a case member with each above-mentioned single switch member and this case member is attached in the field by the side of the anti-shift lever of a guide plate, the subassembly of two or more of these switch members can be first carried out to a case member, and assembly nature improves.

[0028] Furthermore, it is attached so that the above-mentioned case member may pinch this guide plate by the reinforcement member arranged in the field by the side of the shift lever of a guide plate according to the 5th invention. In that case, the splash [ the contact section is prepared in the above-mentioned reinforcement member, and ] in the predetermined range of a shift lever in this contact section, That is, since it constituted so that the end section of the 2nd pin member rocked with manual gear change actuation might contact, the impact at the time of splash actuation of a shift lever is responded to by this reinforcement member, and protection of a guide plate is achieved.

[0029] According to the 6th invention, and the 2nd switch member for mode selection which assists the above-mentioned switch member for mode selection Since it is supported by the supporter material prepared in the opposite hand of a guide plate on both sides of the shift lever Even when the 1st switch member for mode selection with which the above-mentioned guide plate was equipped breaks down, for example, while M mode selection is detected convenient The 2nd contact section is prepared in the above-mentioned supporter material as well as the above-mentioned reinforcement member. Since it constituted so that the other end of the 2nd pin member rocked with manual gear change actuation of a shift lever in this 2nd contact section might contact The impact at the time of splash actuation of a shift lever is responded to by this supporter material with the above-mentioned reinforcement member, this impulse force distributes, and protection of a guide plate is achieved much more effectively. Furthermore, since the both ends of the 2nd pin member are caught by a reinforcement member and supporter material, \*\*\*\*\* of this 2nd pin member will be reduced.

[0030]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained.

[0031] Similarly the side elevation of the gear change actuation input device 1 which drawing 1 requires for the gestalt of this operation, and drawing 2 are top views, the gear change actuation input device 1 concerned has covering 2, and the upper part of a shift lever 3 projects from long and slender opening 2a in the cross direction prepared in this covering 2.

[0032] This shift lever 3 is operated by the cross direction along with opening 2a of the above-mentioned covering 2, and D and M common range (only henceforth a "common range") which are attained possible [ a change ] by predetermined actuation of an operator which P range, R range, N range and D mode in which automatic gear change is performed, and the M mode to which manual gear change is performed mention later are chosen from the car-body front by that actuated valve position. Moreover, the shift up location and the down-shift location are established in the actuated valve position of the above-mentioned common range arranged at the method of the last of this range train forward and backward, respectively centering on the center valve position of the shift lever 3 of manual gear change actuation when M mode is chosen. And while the display board 4 in which these actuated valve positions are shown is formed in the side of opening 2a in the above-mentioned covering 2, this opening 2a is closed by the slide plate 5 which engages with a shift lever 3 and is slid forward and backward according to actuation of this lever 3. Furthermore, deregulation carbon

button 3d for this shift lever 3 to cancel the regulation on shift actuation to control unit 3c of an upper bed by covering the upper part by coat member 3b from that pars intermedia while the body is constituted by pipe member 3a, and mode change-over-switch 3e D in a common range and for an M mode change are prepared.

[0033] And when a shift lever 3 is operated in a common range from other range ahead of a range train, D mode is attained first. While a gear ratio is switched based on the gear change property set up beforehand, gear change mode is switched to M mode by making the above-mentioned mode change-over-switch 3e slide caudad in this condition. And by carrying out splash actuation of the shift lever 3 a core [ a center valve position ] into a common range by this M mode in the shift up location or down-shift location of order, a gear ratio is switched manually.

[0034] Next, when the structure of the part caudad arranged from the above-mentioned covering 2 of the gear change actuation input device 1 is explained, this equipment 1 is fabricated with synthetic resin, and it has the base member 10 as car-body flank material attached in a car body with the bolt (not shown) inserted in four boltholes 11....11 approximately.

[0035] While the hollow box-like lobe 12 which projects below is formed in the center section of this base member 10 and Holes 12a and 12a are formed in the right-and-left both-sides side of this lobe 12 In the soffit section of pipe member 3a which constitutes the above-mentioned shift lever 3 3f of pivots which are prolonged in a longitudinal direction so that the shape of reverse of T characters may be made and which similarly become by the pipe member has fixed. Fitting of the right-and-left both ends of 3f of this pivot is carried out to the holes 12a and 12a of the above-mentioned lobe 12, respectively, and the shift lever 3 is supported by the cross direction rockable to the base member 10 thru/or the car body in accordance with the above-mentioned range train.

[0036] And on this base member 10, the actuation device of the shift up switch which detects the positioning device of a shift lever 3, the shift actuation regulation device which regulates actuation between each range of a shift lever 3, the actuation device of M mode switch in\_which it detects that M mode was chosen by actuation of mode change-over-switch 3e and splash actuation of the shift lever 3 in M mode, i.e., the shift up actuation by hand control, and down-shift actuation, and a down-shift switch etc. is arranged.

[0037] The above-mentioned positioning device consists of the positioning section 13 prepared in the base member 10, and a flat-spring member 14 attached in the shift lever 3. among these, that upper limb centers the positioning section 13 on the center of oscillation of the above-mentioned shift lever 3 while it is constituted by the wall of the cross direction set up in [ this base member 10 ] one ahead of the lobe of the shift lever 3 in the top-face center section of the base member 10 — it considers as a circular face mostly and each positioning crevice for the object for P range, the object for R range, the object for N range, and common range is formed in this circular face from the front. Moreover, while the back end section was fixed through the bracket 15 of the above-mentioned covering 2 in pipe member 3a which constitutes the body of a shift lever 3 which fixed in the lower part location a little and the flat-spring member 14 is prolonged to the front It engages with the crevice corresponding to the range chosen by the shift-lever actuation of each crevice for range in the above-mentioned positioning section 13, the front end section being used as the engagement section by which ups-and-downs shaping was carried out, and, thereby, this shift lever 3 is positioned in each actuated valve position. in that case, crevice 13a for common range of the

method of the last -- the inside of this common range -- setting -- M mode -- a shift lever 3 -- a cross direction -- a shift up and a down shift -- it is formed in the crevice a little long forward and backward so that it may be operational.

[0038] In addition, drawing 1 and drawing 2 show the condition that P range is chosen by the shift lever 3. moreover , although not illustrate to a shift lever 3 , the back end section of an actuation cable be connect through the above-mentioned bracket 15 , this cable be ahead prolong through the rod guide attached in the notch of the first transition section of the base member 10 , it be lead to an inhibitor switch , the manual bulb in a control valve unit or a parking device , etc. , and actuation of a shift lever 3 be transmit to these . Furthermore, if a brake pedal is not stepped on, the cable for the interlocking device in which it prevents from operating this shift lever 3 in a back transit range from P range is also coordinated with the shift lever 3 through the rod guide attached in the notch of the first transition section of the base member 10.

[0039] On the other hand, the shift pin [ which constitutes the actuation device of the above-mentioned shift actuation regulation device, the actuation device of M mode switch, a shift up switch, and a down-shift switch etc. ] especially 1st, and 2nd two shift pin is prepared in the shift lever 3.

[0040] Next, drawing 1 and drawing 3 explain the installation structure of these shift pins. In addition, drawing 3 looks at a shift lever from the same side face as drawing 1 , and the left is the direction of the car-body front on a drawing. The bracket 15 which supports the above-mentioned flat-spring member 14 was bent in the shape of a KO character by plane view, has fixed to this pipe member 3a so that the space section may be formed in the tooth-back side of pipe member 3a which constitutes the body of a shift lever 3, and one near side face (side face of the direction which is visible by drawing 1 and drawing 3 ) in which the flat-spring member 14 was attached extended ahead, and it has covered this side face in the above-mentioned pipe member 3a. And while 3g of long slots and 3g;15a are formed in the right-and-left both-sides side of pipe member 3a, and the up Norikazu side face of a bracket 15 up and down, respectively, the 1st shift pin 21 of a square shape is inserted in 3g of these slots, and 3g;15a, and the both ends project in the method of right-and-left both sides from pipe member 3a.

[0041] A center section is supported by the lower part of the supporter material 22 of the shape of a cylinder which this 1st shift pin 21 has been arranged in pipe member 3a, and was made movable up and down in the inside of this pipe member 3a. within the limits of the slots, 3g and 3g of pipe member 3a -- this supporter material 22 -- the upper and lower sides -- under the supporter material 22 in pipe member 3a, while it is movable The return spring 23 which energizes this supporter material 22 and the shift pin 21 up is arranged. By moreover, pushing actuation [ in / the spring 24 for actuation which comes to wind a coil above this supporter material 22 densely is inserted in in pipe member 3a, and / control unit 3c of the upper bed of a shift lever 3 ] of deregulation carbon button 3d Through this spring 24 for actuation, the above-mentioned supporter material 22 and the 1st shift pin 21 resist the energization force of the downward return spring 23, and are depressed below.

[0042] On the other hand, in the space by the side of the tooth back of pipe member 3a, the 2nd cylinder-like supporter material 25 is held free [ vertical movement ] like the supporter material 22 which supports the above-mentioned 1st shift pin 21. The 2nd spring 26 for actuation which comes to wind a coil densely is arranged also above this 2nd supporter material 25, this spring 26 for actuation is inserted in in coat member 3b behind the

above-mentioned spring 24 for the 1st actuation, and that upper bed section is connected with mode change-over-switch 3e in control unit 3c of the upper bed of a shift lever 3. And the 2nd round shift pin 27 by which both ends project right and left through the 2nd slot 15b and 15b formed in the right-and-left both-sides side in the back of a bracket 15 at the lower part of the 2nd supporter material 25 for a long time than the above-mentioned 1st shift pin 21 is attached in one. Moreover, the bar member 28 is constructed over the soffit section of a bracket 15 by right and left, and the return spring 29 \*\*\*\*(ed) by this bar member 28 has given the energization force to the comparatively weak upper part to the above-mentioned 2nd supporter material 25.

[0043] Here, if the connection structure of the above-mentioned spring 26 for the 2nd actuation and mode change-over-switch 3e is explained, as shown in drawing 2 and drawing 4, the concave 31 prolonged in the shaft orientations of this lever 3 is formed in the top-face side-attachment-wall section of this lever 3 in control unit 3c of the upper bed of a shift lever 3, and the opening 32 prolonged in the shaft orientations of a shift lever 3 as well as the base of this concave 31 is formed in it. And fitting of the sliding of the switch piece 33 of the mode change-over-switch 3e concerned is made free into the above-mentioned concave 31, the height 34 which protruded on the underside reaches the lever 3 interior through the above-mentioned opening 32, and the upper bed section of the spring 26 for the 2nd actuation is connected here through the mounting block 35.

[0044] Thereby, when mode change-over-switch 3e is made to slide up and down along with a concave 31, the spring 26 whole for the 2nd actuation interlocks and moves up and down, and the 2nd shift pin 27 moves in the vertical direction within the limits of Slots 15b and 15b through the above-mentioned 2nd supporter material 25. In addition, the return spring 29 arranged under the 2nd supporter material 25 avoids \*\*\*\*\* of migration of the spring 26 for the 2nd actuation thru/or the 2nd supporter material 25.

[0045] In addition, when the above-mentioned switch piece 33 is depressed caudad, the detent crevice 36 and projection 37 which stop this switch piece 33 in the lower part slide position are formed in the underside of the switch piece 33, and the base in a concave 31, respectively.

[0046] Next, the shift actuation regulation device which regulates the actuation between range of this shift lever 3 is explained. As shown in drawing 5 and drawing 6, toward the front of the range actuation path of a shift lever 3, the guide plate 41 set up by the base member 10 in one in accordance with this actuation path is arranged, and the shift actuation regulation device is constituted by the right-hand side side by this guide plate 41 and the above-mentioned 1st shift pin 21 prepared in the shift lever 3.

[0047] In the field by the side of the shift lever 3 of this guide plate 41 1st regulation side 42a which regulates the actuation to back from P range location of a shift lever 3 from the front by engaging with the right side edge section of the above-mentioned 1st shift pin 21, While the side heavy-gage part 42 is formed before having 2nd regulation side 42b which similarly regulates the actuation to the front from R range location, and 3rd regulation side 42c which similarly regulates the actuation to the front from N range location The rising wood of this heavy-gage part 42 is used as 42d of circular faces, and behind 42d of these circular faces, the free passage slot 43 which extends caudad, and the actuation slot 44 which extends in order from the soffit section of this free passage slot 43 penetrate a guide plate 41 in the thickness direction, and it is formed.

[0048] And the 1st guide gate where the above 1st – the 3rd regulation sides 42a, 42b, and

42c regulate the actuation between range of a shift lever 3 in contact with the right side edge section of the 1st shift pin 21 of the square shape with which the shift lever 3 was equipped is constituted. The 42d of the above-mentioned circular faces, the free passage slot 43, and the actuation slot 44 constitute the 2nd guide GEDO which collaborates with the right side edge section of the round 2nd shift pin 27 which projects across the field by the side of the anti-shift lever 3 of a guide plate 41, and performs change actuation in the gear change mode in a common range.

[0049] Next, each switch actuation device of M mode switch, a shift up switch, and a down-shift switch is explained. The case 51 where evacuation section 51a of a configuration which corresponds to drawing 5 and drawing 7 mostly with this free passage slot 43 and the actuation slot 44 in the field by the side of the anti-shift lever 3 of the above-mentioned guide plate 41 in the free passage slot 43 of the above-mentioned guide plate 41 and the actuation slot 44, and a corresponding location in the center section so that it may be shown was formed is attached. With two or more bolts 52--52, it is fixed to the above-mentioned guide plate 41 through the reinforcement plate 53 arranged in the field by the side of the shift lever 3 of a guide plate 41, and this case 51 is made into the structure which sandwiched the guide plate 41 in the thickness direction with this case 51 and the reinforcement plate 52. In addition, it is formed in the configuration to which this reinforcement plate 52 also corresponds mostly with this free passage slot 43 and the actuation slot 44 in the free passage slot 43 of the above-mentioned guide plate 41 and the actuation slot 44, and a corresponding location.

[0050] And in the above-mentioned case 51, as the above-mentioned evacuation section 51a is surrounded, under this evacuation section 51a, the front and behind this evacuation section 51a, the shift up switch 55 and the down-shift switch 56 fit in, respectively, and the M mode switch 54 is held. In that case, the lever members 55a and 56a of contact piece 54a of the M mode switch 54, the shift up switch 55, and the down-shift switch 56 are projected and located in the actuation slot 44 in the inside of the above-mentioned evacuation section 51a thru/or a guide plate 41, respectively. When the right side edge section of the 2nd shift pin 27 carries out lower part migration into the actuation slot 44 in a guide plate 41 Contact piece 54a of the M mode switch 54 is pressed in the right side edge section of the above-mentioned pin 27 which projects across the field by the side of the anti-shift lever 3 of a guide plate 41, and an M mode signal is outputted. and when the right side edge section of the 2nd shift pin 27 carries out longitudinal slide movement in the actuation slot 44 in this condition The lever members 55a and 56a of the shift up switch 55 or the down-shift switch 56 are pressed by this pin 27, and a shift up signal or a down-shift signal is outputted.

[0051] Furthermore, as shown in drawing 5 and drawing 8, the buttress plate 61 attached to the left-hand side side by the base member 10 in accordance with this actuation path toward the front of the range actuation path of a shift lever 3 is arranged. In the location where this buttress plate 61 also corresponds with the free passage slot 43 of the above-mentioned guide plate 41, and the actuation slot 44 While being formed in this free passage slot 43 and the actuation slot 44, and the configuration that corresponds mostly and engaging the left side edge section of the 2nd shift pin 27 When the 2nd M mode switch 62 is supported by this buttress plate 61 and the right side edge section of the 2nd shift pin 27 carries out lower part migration into the actuation slot 44 in a guide plate 41 Contact piece 62a of the above-mentioned 2ndM mode switch 62 is pressed in the left side edge section of the above-mentioned pin 27, and an M mode signal is outputted. By this The M mode detection devices for fail-safe at the time of failure of the 1st M mode switch 54 held in the

above-mentioned case 51 by the side of a guide plate 41 etc. are constituted.

[0052] Next, an operation of this gear change actuation input unit 1 is explained.

[0053] First, while pushing in deregulation carbon button 3d of a shift-lever 3 up edge and not operating it, the 1st shift pin 21 is energized by the Slots [ 3g and 3g ] upper part. In this condition, since there is no regulation side between N range and D range in a guide plate 41, therefore migration of the 1st shift pin 21 is not regulated as shown in drawing 6, a shift lever 3 can be operated freely, but when this pin 21 contacts 3rd regulation side 42c from N range to R range, actuation of a shift lever 3 is regulated. Moreover, also when a shift lever 3 is in P range location, in contact with 1st regulation side 42a, the actuation to R range or D range is regulated for the 1st shift pin 21.

[0054] Moreover, where deregulation carbon button 3d is pushed in halfway, the 1st shift pin 21 is depressed to the mid-position, the actuation of it to R range is attained from N range, but in this condition, since the 1st shift pin 21 contacts 2nd regulation side 42b, the actuation to P range from R range is regulated. And if the above-mentioned carbon button 3d is pushed in further and the 1st shift pin 21 is moved to the Slots [ 3g and 3g ] bottom, the actuation to P range from the above-mentioned R range and the actuation to back from P range will also become possible.

[0055] Next, a motion of the 2nd shift pin 27 is described. When a shift lever 3 is in the range of P range to N range, this 2nd shift pin 27 is located above 42d of circular faces of the rising wood of a guide plate 41, and carries out longitudinal slide movement along with 41d of these circular faces. Therefore, since this 2nd shift pin 27 contacts the 41d of the above-mentioned circular faces even if it carries out push-down actuation of the mode change-over-switch 3e during this period, that lower part migration is prevented. On the other hand, since the 42d of the above-mentioned circular faces breaks off and opening of the free passage slot 43 is carried out when a shift lever 3 is operated by the common range, by carrying out push-down actuation of the above-mentioned mode change-over-switch 3e, the 2nd shift pin 27 passes through this free passage slot 43, and carries out lower part migration into the actuation slot 44.

[0056] And although, as for gear change mode, D mode is first chosen when a shift lever 3 is operated by the common range at this time, and automatic gear change is performed by this, when an operator does push-down actuation of the mode change-over-switch 3e, if ON actuation of the M mode switch 44 is carried out, gear change mode will switch to M mode. At this time, the 2nd shift pin 27 is located in the center section of the actuation slot 44, this is made into a center valve position, by rocking a shift lever 3 from this center valve position in the shift up location or down-shift location of order, ON actuation of the shift up switch 55 or the down-shift switch 56 will be carried out by the above-mentioned positioning device, respectively, and manual gear change will be performed according to it.

[0057] On the other hand, when an operator pushes up and operates mode change-over-switch 3e in a center valve position, and the M mode switch 44 is turned off, gear change mode will switch from M mode to D mode, and manual gear change will be performed again. In a common range, D and two kinds of gear change modes M Different will be attained possible [ a switch ] by this.

[0058] In that case, since mode change-over-switch 3e to which slide actuation, i.e., change actuation in the mode, is carried out thru/or its switch piece 33 grade are prepared in the shift lever 3 by the operator, it is easily recognized from the appearance of this shift lever 3 that the car concerned is a car with M mode.

[0059] Moreover, since on-off operation of the M mode switch 54 is carried out by whether the 2nd shift pin 27 is in an upper part location, or it is in a lower part location and the change in gear change mode is performed by this by it, it is controlled that this change control becomes complicated.

[0060] In addition, in a shift up location or a down-shift location, since the 2nd shift pin 27 contacts the rising wood of an actuation slot, can push up mode change-over-switch 3e, and it cannot be operated, but an operator needs to return a shift lever 3 to a center valve position. The operation mistake of pushing up and operating mode change-over-switch 3e accidentally in the midst of manual gear change actuation, and returning to D mode by this can be prevented.

[0061] At the time of the manual gear change by M mode, furthermore, the right side edge section of the 2nd shift pin 27 Although the front end section of the actuation slot 44 of a guide plate 41 and the back end section are contacted, the impulse force of splash actuation of a shift lever 3 is responded to by this by the guide plate 41 and this may become lowering of the endurance of this guide plate 41, and the cause of breakage the [ for fail-safe ], since it constituted so that the left side edge section of the 2nd shift pin 27 might be simultaneously caught with the buttress plate which supports the 2M mode switch 62 While the impulse force can distribute and weaken and lowering, breakage, etc. of the endurance of a guide plate 41 are controlled, the 2nd shift pin 27 will be caught at both ends, and \*\*\*\*\* will be prevented. the [ moreover, / for fail-safe ] — since the 2nd shift pin 27 was received at both ends using the buttress plate which supports the 2M mode switch 62, combination-izing of a member and communalization are attained and buildup of components mark can be controlled.

[0062] And it sets to the gear change actuation input unit 1 concerned in this way. A shift lever 3 is equipped with two shift pins, the 1st and the 2nd, 21 and 27. The two guide gates, the 1st and the 2nd, which engage with each shift pins 21 and 27, respectively are established in a guide plate 41. Moreover, in the group of the 1st shift pin 21 and the gate The change actuation between the range of a shift lever 3 is regulated chiefly. In the group of the 2nd shift pin 27 and the gate Since it constituted so that change actuation in the gear change mode between D mode and M mode might be performed Respectively heterogeneous actuation will assign the group of the shift pin of dedication, and the gate, and will be performed to mutual [ which is called actuation between these range, and actuation between the modes ], and improvement in the precision of each actuation and dependability will be achieved by this.

[0063] Moreover, the M mode switch 54 operated by M mode, and a shift up and the down-shift switches 55 and 56 are held in one case 51, since it constituted so that this case might be attached in a guide plate 41, the subassembly of these switches 54-56 can be first carried out to a case 51, and assembly nature is improved.

[0064] Moreover, it is the reinforcement plate 52 for attaching this case 51 in a guide plate 41, and you may constitute so that the right side edge section of the 2nd shift pin 27 may be caught further simultaneously. In that case, the impulse force of splash actuation of the shift lever 3 at the time of manual gear change will distribute further, and can weaken, and lowering, breakage, etc. of the endurance of a guide plate 41 will be controlled further.

[0065] Since the 1st gate which collaborates with the 1st shift pin 21 and regulates actuation between range on the other hand, and the 2nd gate which collaborates with the 2nd shift pin 27 and regulates actuation between gear change modes were established in one guide plate 41, share-izing of a member and combination-ization are attained and buildup of components mark can be controlled compared with the case where these gates are established in various

members.

[0066] In addition, although the configuration of the actuation slot 44 of the guide plate 41 which responds to the impact of the longitudinal slide movement of the shift lever 3 at the time of the manual gear change in M mode in contact with the both ends of the 2nd shift pin 27, respectively, and the slot of a buttress plate 61 was made almost the same in the above for example, when the base member 10 and a guide plate 41 are really fabricated by resin and a buttress plate 61 is created with the metal plate of high rigidity from this resin You may constitute so that the slot of a buttress plate 61 may be formed a little greatly and the 2nd shift pin 27 may contact the actuation slot 44 of a guide plate 41 previously. It is because the collision sound of the metal buttress plate 61 and the shift pin 27 can be controlled. In addition, the buttress plate 61 as well as a guide plate 41 may the base member 10 and really be fabricated by resin, and since a metallic sound does not carry out at the time of the collision with the shift pin 27, it is made for the both ends of the shift pin 27 to contact these by making both slot into the shape of isomorphism in that case at abbreviation coincidence.

[0067] Furthermore, when it constitutes so that the reinforcement plate 53 may receive the splash of the 2nd shift pin 27 and this reinforcement plate 53 is created with the metal plate of high rigidity, it constitutes so that the slot of this reinforcement plate 53 may be formed a little more greatly than the actuation slot 44 of a guide plate 41 and the 2nd shift pin 27 may contact the actuation slot 44 of a guide plate 41 previously. It is because the collision sound of the metal reinforcement plate 53 and the shift pin 27 can be controlled.

[0068]

[Effect of the Invention] While being constituted according to the 1st invention of this application as mentioned above so that D and the M car mode may be attained in a predetermined range of two or more range, to a shift lever, it is movable in the shaft orientations of this lever, and the 1st pin member which collaborates with the 1st guide gate and regulates the actuation between range of this lever is prepared.

[0069] The 2nd pin member is prepared apart from [ it is the same and / a shift lever ] the above-mentioned 1st pin member. Moreover, this 2nd pin member In different shaft orientations from the migration direction of the above-mentioned 1st pin member while [ between the 1st location and the 2nd location ] it is movable When this 2nd pin member engages with the 2nd guide gate and a shift lever is in range other than the above-mentioned predetermined range, while the migration in the 2nd location from the 1st location of the above is forbidden, when a shift lever is in the above-mentioned predetermined range, the that 1st and 2nd migration between locations is permitted.

[0070] And an operating member is prepared in a shift lever and 1st [ of the above-mentioned 2nd pin member ] and 2nd migration between locations is performed to it by actuation of this operating member by the operator. therefore, when a shift lever is in the above-mentioned predetermined range When an operator can operate the above-mentioned operating member, and can move the 2nd pin member between the 1st location and the 2nd location, consequently the 2nd pin member is moved to the 1st location When D mode is chosen and it is moved to the 2nd location by the mode selection means, M mode will be chosen, and in the above-mentioned predetermined range, D and the M car mode will be attained by this.

[0071] In that case, since the operating member operated by the operator is prepared in the shift lever, it is easily recognized from the appearance of this shift lever that it is a car with M mode.

[0072] Moreover, since the change in the mode is performed by whether the 2nd pin member

is in the 1st location, or it is in the 2nd location, control of the mode change will not become complicated.

[0073] On the other hand, since the 1st guide gate for the 1st pin members and the 2nd guide gate for the 2nd pin members are especially established in the single guide plate with which car-body flank material was equipped according to the 2nd invention, the member which prepares each guide gate can be communalized and buildup of components mark is controlled.

[0074] Moreover, while the configuration of the guide-plate circumference is materialized more, and the 1 side of this lever is equipped with this guide plate along the range actuation direction of a shift lever according to the 3rd invention according to it, the 2nd guide gate is formed as a slot which penetrates this guide plate, and the 2nd pin member projects through the slot which is this 2nd guide gate in the field by the side of the anti-shift lever of a guide plate.

[0075] On the other hand, a mode selection means has the switch member turned on by being pressed, and is formed in the field by the side of the anti-shift lever in which the 2nd pin member projects [ this switch member for mode selection, and the switch member for shift ups and the switch member for down shifts which are turned on by similarly being pressed ] in the above-mentioned guide plate.

[0076] And since the above-mentioned switch member for mode selection is pressed by this 2nd pin member when a shift lever is in a predetermined range and the 2nd pin member is moved to the 2nd location from the 1st location, by this, this switch member for mode selection will turn on, and M mode will be chosen. On the contrary, when the 2nd pin member is moved to the 1st location from the 2nd location, since press according [ the above-mentioned switch member for mode selection ] to this 2nd pin member is canceled, by this, this switch member for mode selection will turn off, and D mode will be chosen.

[0077] Moreover, it is in the condition that the 2nd pin member was moved to the 2nd location, that is, since the above-mentioned switch member for shift ups or the switch member for down shifts is pressed by this 2nd pin member when a shift lever is rocked within the above-mentioned predetermined range where M mode is chosen, by this, these switch members will be turned on and manual gear change in M mode will be performed.

[0078] Furthermore, according to the 4th invention, since it holds in a case member with each above-mentioned single switch member and this case member is attached in the field by the side of the anti-shift lever of a guide plate, the subassembly of two or more of these switch members can be first carried out to a case member, and assembly nature improves.

[0079] Furthermore, it is attached so that the above-mentioned case member may pinch this guide plate by the reinforcement member arranged in the field by the side of the shift lever of a guide plate according to the 5th invention. In that case, the splash [ the contact section is prepared in the above-mentioned reinforcement member, and ] in the predetermined range of a shift lever in this contact section, That is, since it constituted so that the end section of the 2nd pin member rocked with manual gear change actuation might contact, the impact at the time of splash actuation of a shift lever is responded to by this reinforcement member, and protection of a guide plate is achieved.

[0080] According to the 6th invention, and the 2nd switch member for mode selection which assists the above-mentioned switch member for mode selection Since it is supported by the supporter material prepared in the opposite hand of a guide plate on both sides of the shift lever Even when the 1st switch member for mode selection with which the above-mentioned guide plate was equipped breaks down, for example, while M mode selection is detected

convenient. The 2nd contact section is prepared in the above-mentioned supporter material as well as the above-mentioned reinforcement member. Since it is constituted so that the other end of the 2nd pin member rocks with manual gear change actuation of a shift lever in this 2nd contact section might contact. The impact at the time of splash actuation of a shift lever is responded to by this supporter material with the above-mentioned reinforcement member, this impulse force distributes, and protection of a guide plate is achieved much more effectively. Furthermore, since the both ends of the 2nd pin member are caught by a reinforcement member and supporter material, \*\*\*\*\* of this 2nd pin member will be reduced.

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[Translation done.]

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the side elevation of the gear change actuation input unit concerning the gestalt of operation of this invention.

[Drawing 2] It is the top view of this equipment.

[Drawing 3] It is the amplification side elevation showing the important section of the shift lever in this equipment.

[Drawing 4] It is the expanded sectional view showing the control unit of this shift-lever upper bed.

[Drawing 5] It is the rear view showing the configuration on the base member in this equipment.

[Drawing 6] It is the side elevation of a guide plate which met the a-a line of drawing 5.

[Drawing 7] It is the sectional view showing the internal structure of the switch casing which met the b-b line of drawing 5.

[Drawing 8] It is the side elevation showing mounting of 2nd M mode switch.

[Description of Notations]

1 Gear Change Actuation Input Unit

3 Shift Lever

3d Deregulation carbon button

3e Mode change-over switch

10 Base Member

21 1st Shift Pin

27 2nd Shift Pin

41 Guide Plate

**42d Circular face**  
**43 Free Passage Slot**  
**44 Actuation Slot**  
**51 Switch Casing**  
**53 Reinforcement Plate**  
**54 M Mode Switch**  
**55 Shift Up Switch**  
**56 Down-Shift Switch**  
**61 Buttress Plate**

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[Translation done.]